

# Assignment 01

Amyre Wells

2025-01-07

Git Repository

## Set Up

```
source('dataGenerator.R')  
#This generates data for species name, limb width, limb length, and observer name columns  
  
source('volumeEstimator.R')  
  
##  
## Attaching package: 'dplyr'  
## The following objects are masked from 'package:stats':  
##  
##   filter, lag  
## The following objects are masked from 'package:base':  
##  
##   intersect, setdiff, setequal, union  
#This calculates the volume of limbs using the formula for the volume of a cylinder  
  
#load in libraies  
library(dplyr)  
library(ggplot2)
```

## Sort data

```
sorted_data <- measurements %>%  
  arrange(Limb_Volume_cm3) %>%  
  arrange(Observer) %>%  
  arrange(Species_Name)  
  
#data is now sorted alphabetically by species, then observer, then in ascending order of limb volume
```

## Average Limb Volume by Species

```
#get average limb volume for each species  
average_volume <- measurements %>%  
  group_by(Species_Name) %>%  
  summarize(Average_Volume = mean(Limb_Volume_cm3))
```

```

#print results
print(average_volume)

## # A tibble: 5 x 2
##   Species_Name Average_Volume
##   <chr>          <dbl>
## 1 Ally          41.7
## 2 Bally         46.8
## 3 Cally         44.3
## 4 Dally         39.7
## 5 Elly         49.6

```

## Number of Observations by Species and Observer

```

#get number of observations for each combination of species/observer
counts <- measurements %>%
  group_by(Species_Name, Observer) %>%
  summarize (Count = n())

## `summarise()` has grouped output by 'Species_Name'. You can override using the
## `.groups` argument.

#create matrix for count data where x is observers and y is species
count_matrix <- matrix(counts$Count, nrow = 5, byrow = TRUE)
colnames(count_matrix)<- observer_vec
rownames(count_matrix)<- species_vec

#convert to table
count_table<- as.table(count_matrix)

#print result
print(count_table)

##           Xeb Yeb Zeb
## Ally      7   8   8
## Bally     8   5   8
## Cally     7  11   4
## Dally     9   5   4
## Elly     9   5   2

```

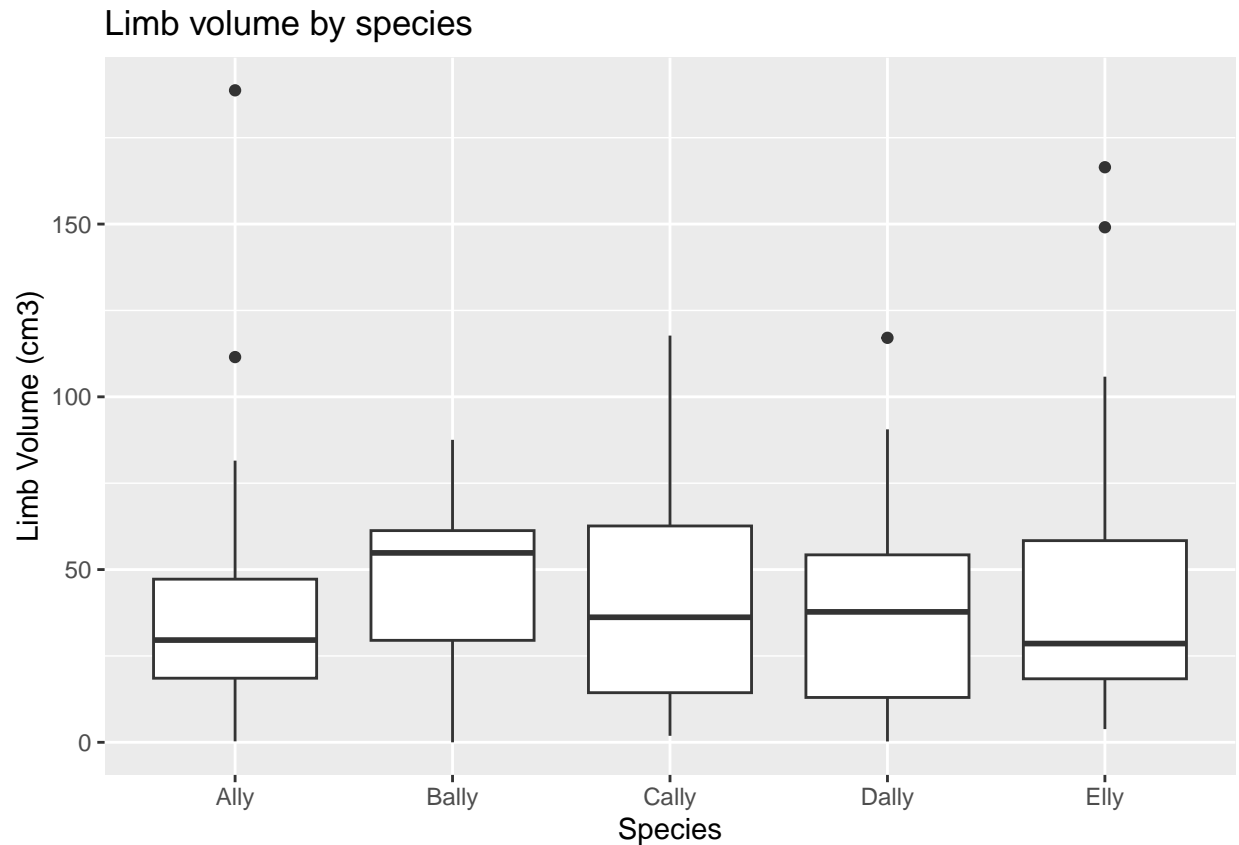
## Boxplot

```

#create box plot of limb volume by species
boxplot<- ggplot(measurements, aes(x=Species_Name, y=Limb_Volume_cm3)) +
  geom_boxplot() +
  labs(title="Limb volume by species", x="Species", y="Limb Volume (cm3)")

print(boxplot)

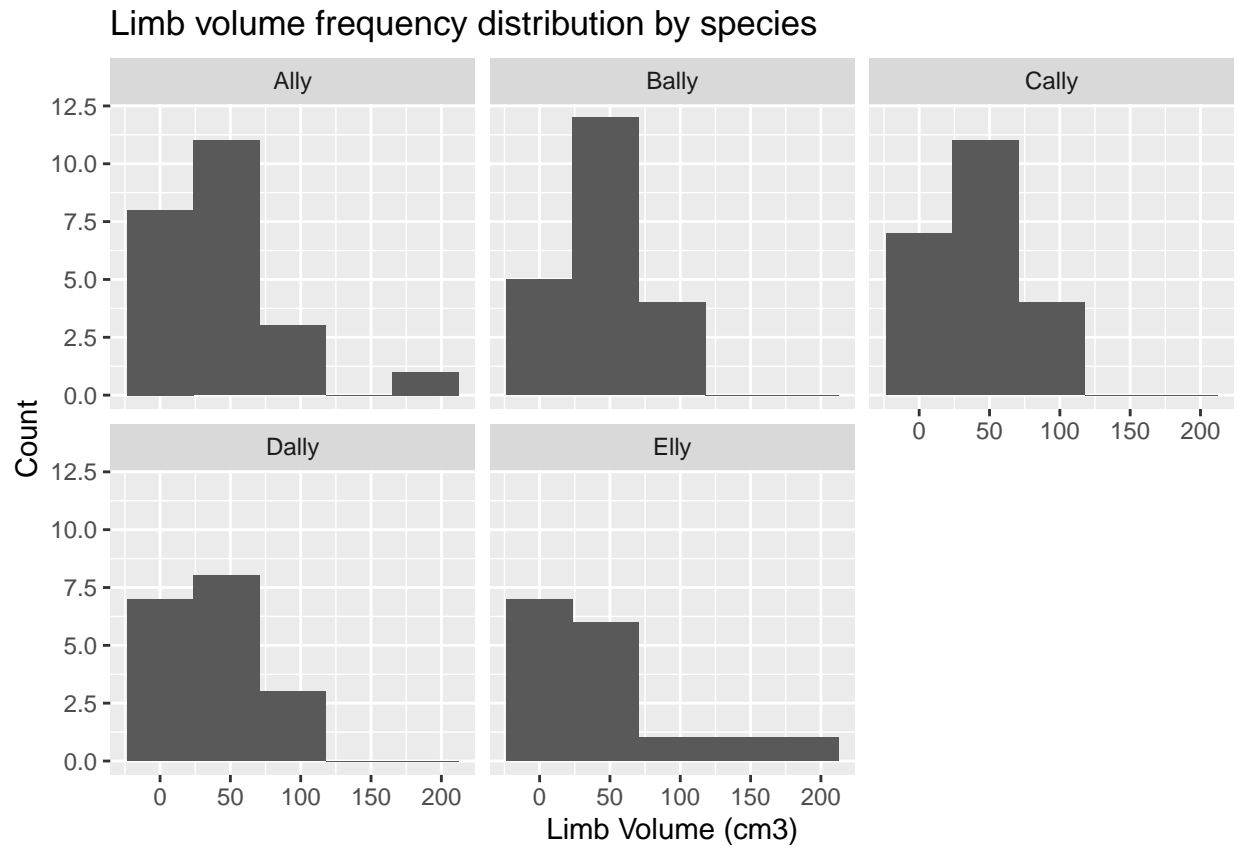
```



**Figure 1.** Graph depicting limb volume data in cm3 for species Ally, Bally, Cally, Dally, and Elly. Volume was calculated using the formula for the volume of a cylinder.

## Frequency Histograms

```
#create faceted histogram of limb volume by species
histogram<- ggplot(measurements, aes(x=Limb_Volume_cm3)) +
  geom_histogram(bins = 5) +
  facet_wrap(~Species_Name)+
  labs(title="Limb volume frequency distribution by species", x="Limb Volume (cm3)", y="Count")
print(histogram)
```



**Figure 2** Graph depicting frequency distribution of limb volume data in cm3 for species Ally, Bally, Cally, Dally, and Elly. Volume was calculated using the formula for the volume of a cylinder.